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NOTES ON A VOYAGE TO THE GREENLAND SEA IN 1888.

BY ROBERT GRAY.

(Continued from p. 9.)

MAY 21.—Lat. $79^{\circ} 16'$, long. $4^{\circ} 46'$ E. Temperature at the surface, 30° ; water slightly green. The wind fresh from the westward, blowing the young ice away from the floes, a narrow intermediate strip of water being formed, along which we sailed in a south-westerly direction. In the morning a small Greenland Whale passed near the ship, going N.N.W. towards a well-known part of the whaling-grounds, at present covered with ice. *Mysticetus*, when on a passage, is not to be mistaken. With the upper jaw above water and the back just covered, the animal while at the surface moves steadily along; a slight disturbance of the surface-water, in the form of a series of circles, breaking out in its rear, marking the action of the caudal fin.

May 24.—Lat. $78^{\circ} 54'$, long. 1° W. Water slightly green; temperature at the surface, 29° . Experienced a slight swell from the southward in the morning, which broke up at the "floes" in the vicinity; on proceeding to the westward, however, we lost it, being sheltered by a point of ice to the southward. A large Whale appeared near the ship at night, evidently feeding.

May 25.—Lat. $78^{\circ} 21'$, long. 2° W. Water green, but clear; temperature at the surface, 29° . Cruised under canvas in a small

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space of open water surrounded by "pack" or broken-up ice on all sides. Blowing hard from the northward, with showers of snow, the sea torn into a sheet of foam, the short sharp waves breaking high along the face of the lee-ice. There were many Whales about, but the boats being unable to pull to windward we did not succeed in making any captures. As may be supposed, the drift of the ice under the influence of such a strong wind was very great, and this being so it seemed somewhat remarkable that while the ocean on all sides should be covered with drifting-ice, one small space should remain open. I noticed, however, that the open space became smaller and smaller, until finally, owing to the closing of the ice, we had to quit it altogether and force our way northward against wind and current towards another open space which had in the mean time broken out. This open space shared a similar fate, but not before another and similar space had formed, also to the northward; in fact, a series of open spaces were forming and reforming, and being covered with ice. Perhaps the current was performing a vorticose movement, a series of vortices being formed, with the water welling up in the centre.

May 26.—Lat. $78^{\circ} 13'$, long. $3^{\circ} 15'$. Water green, but clear; temperature at the surface, 29° . Many Whales about, but otherwise very little appearance of life. The Whales were mostly coming out of the "pack" ice to the southward, crossing the open water and entering the ice to the northward, but some of them seemed inclined to sport about in the open water, returning again to the shelter of the ice. One which we harpooned made off into the "pack," but the men being able to run over the ice with lances, we eventually secured it after some trouble. In the evening we chased several other Whales, but without success; the 'Hope,' however, made a capture. Concerning the Whale which we killed I took the following scanty notes:—

Sex.—Female.

Colour.—Sooty black, with the exception of a few feet of white extending backwards from the symphises along the under surface of the lower jaw.

Measurements.—From tip of lower jaw to eye, 14 ft.; to umbilicus, 20 ft. 6 in.; to anterior end of vulva, 26 ft.; to posterior end of vulva, 27 ft. 6 in.; to median cleft of caudal fin, 42 ft. 6 in. Thickness of blubber, 8 in.

Whalebone.—The total number of plates of sufficient size to be considered marketable was 569; of these the largest measured 7 ft. 6 in. in length. Towards the extremities of the series of plates attached to each side of the upper jaw the whalebone-plates diminish in length, as also does the width of the interspaces, the latter decreasing from .615 in. to .384 in. Having already shown that the number of the whalebone-plates does not vary with growth, but remains constant (Zool. 1887, p. 136), and having found the width of the interspaces, where greatest, in a full-grown Whale we killed last year to be .92 in., it is very evident that with growth and consequent increase in the length of the upper jaw the whalebone-plates become farther and farther apart.

Palate.—From sections which I made I found the palate about the middle of the jaw, where narrowest, to be only 3 in. in breadth, convex, and flesh-coloured, with irregular bluish grey markings. Immediately external to the palate the whalebone-plates are found, at first in the form of hairs, but altering gradually to the large functional plates situated most externally.

Hind Limbs.—These interesting rudiments I found could be most easily cut out by marking out a rectangular area of skin about three feet square, with the opening of the vulva included in its centre; by then cutting inwards at right angles to the surface, through the blubber, and through the muscles of the abdominal wall, the whole mass may be speedily removed, and the bones dissected out at leisure.

Valves.—The presence of automatic valves closing the natural openings, and thereby preventing the ingress of water while under pressure, has long been known to exist in *Mysticetus*. On making sections of the external auditory meatus as it passed through the blubber, I found it provided with a valve in the form of a conical outgrowth of adipose tissue, the apex of which is directed outwards.* A somewhat similar but larger structure, attached to the opening of the vagina, evidently acted in the same way with regard to the opening of the throat, as also did another which on a previous occasion I examined, attached to the base of the tongue, but which probably represents the epiglottis.

Fæces.—According to the general opinion of whalers, the fæces of the Greenland Whale is usually of a reddish colour, and this view was supported by what I observed, the colour while floating in the water being vermilion, and as it exuded from the vent chocolate-brown. Under the microscope, it is seen to consist in great part of crustacean remains, but what the species is it is impossible to determine.

May 27.—Lat. 77° 49', long. 4° W. Water clear and blue in the morning; temperature, 29°; but after working northwards

* See 'Journal of Anatomy and Physiology,' vol. xxiii. p. 300.

we again found it discoloured at night. The diatom-stained water, so far as we observed, lay to the north-eastwards, its western outline agreeing with the margin of the heavy ice, and its southern, for some distance eastwards from the ice-edge, with the parallel of lat. 78° . The first Whales we saw were in lat. 79° , and we continued seeing them as we drifted southwards until the colour of the water became blue. In this case, then, the discoloured water and the Whales also were maintaining their position, while we ourselves, along with the ice, were being drifted southwards with the wind. Moreover, I observed a few days afterwards, while lying in the blue clear water to the southward of the discoloured water, that many of the pieces of ice had their margins tinged with an orange-yellow, showing that while drifting southwards they had encountered an abundance of diatoms floating in the water. Only one Whale seen to-day; it rose close under the bows, but, hearing the ship, made off immediately into the ice.

May 28.—Lat. $77^{\circ} 58'$, long. $2^{\circ} 21'$. Water slightly green; temperature at the surface, 29° . In the morning a Whale was reported coming up from the southward, towards the open space of water in which we were lying. Two boats, which lowered away from the ship, took up positions and awaited the appearance of the animal, continuing, however, to pull slowly to windward to keep their ground. As ill luck would have it, one of the boats happened to be pulling just over the place where the Whale intended to rise, and the animal, alarmed evidently by the movement of the oars, "smothered its blast," as whalers say (*i. e.*, discharged, while under water, a large volume of air which it probably had intended to expire), and then set off into the ice without ever rising to the surface.

May 30.—Lat. $78^{\circ} 5'$, long. $3^{\circ} 30' W$. Water slightly green; temperature at the surface, 29° . Two Blue Fin-Whales, *Balenoptera Sibbaldii*, appeared near the ship during the day, the ice evidently having already opened out sufficiently to enable these animals to find their way on to the rich feeding-grounds in the neighbourhood. The appearance of "Finners," as these Whales are called, on the whaling-grounds, heralding, as it does, the speedy departure of *Mysticetus* icewards to less accessible regions, is not regarded with much favour by the whalers. So intimately related geographically as these animals undoubtedly

are, inhabiting the same localities, and feeding in a manner so similar, that many forms must necessarily be common to both as their food, I cannot but suppose that previous to the commencement of the fishery, when the Greenland Whale was infinitely more numerous and less retiring in its habits, the relative distribution of the two animals must have been very different. The area of the feeding-grounds remaining constant, the struggle all along has been one of a slow swimmer with long whalebone plates *versus* a swift and active animal with short plates, with this qualification, however, that *Mysticetus* has become specialised to inhabit those parts of the feeding-grounds covered by ice, its congener to occupy rather the open ocean. The prolonged prosecution of the Whale fishery, and the consequent reduction in numbers of the Greenland Whale, has favoured a corresponding increase in the abundance of the Blue Whale, at the same time permitting its intrusion upon the habitat of *Mysticetus*, and hence its frequent appearance amongst the ice, where for weeks the ships now search vainly for the Greenland Right Whale. Furthermore (and a similar argument applies to the case of the Saddle Seals), if the capture of *Mysticetus* was to cease henceforward, ages probably would elapse before it would arrive at its former abundance, having to compete with intruders on its feeding-grounds. During the last twenty years the average number of Whales killed yearly has been only about ten: now this small number cannot amount to much in the same seas where in ten years the Dutch killed no less than 10,019 Whales. Far, however, from the animal becoming more abundant, it appears to become every year more rare.

May 31.—Lat. $78^{\circ} 24'$, long. $0^{\circ} 25'$ E. A strange bird was seen to-day in company with several Snow Birds. From the description I received, it may have been Ross's Gull, *Rhodostethia rosea*.

June 3.—Lat. $79^{\circ} 8'$, long. $0^{\circ} 23'$ W. The ice to the westward having opened out with the recent westerly winds, we sailed in that direction into a large water surrounded by floes. The water was clear and blue, with a total absence of animal life. This is a good example of the fact that, when the ice drifts off any part of the ocean, upon which for some time it has been previously lying, there is always a complete absence of vegetable life at the surface. Darkness must obtain beneath the fields of ice, and

hence the absence of diatoms. The absence of animal life proves that in the ocean, as well as upon the land, independent of plant-life animals cannot flourish.

June 8.—Lat. $77^{\circ} 38'$, long. $0^{\circ} 7'$ E. Shot a Turnstone, *Streptilas interpres*, the first straggler of the kind I have ever met with on the whaling-grounds.

June 10.—Lat. $78^{\circ} 10'$, N., long. 2° W. It so happens that we are in the same position as on May 25th, when we were lying in the open space of water amongst the ice, as described. The formation of the ice still remains the same, and the surface water continues deeply discoloured with diatoms. The position remaining the same, it is interesting to note the different kinds of ice which have been drifted southwards over the ground during the interval. On the first occasion of our visiting the locality the sea was covered with broken-up bay ice; this, however, was soon replaced by bay floes, these in turn by newly broken-up fields of heavy ice, and finally large floes appeared and covered the ground. Subsequent to the appearance of the latter we saw no more Whales, and I have little doubt they retreated southwards, whence they came, before the large fields of ice.

June 14.—Lat. $77^{\circ} 30'$, long. $0^{\circ} 3'$ W. Owing to our not having seen any Whales since May 28th, and swell having come in from the S.E. and broken up all the floes, we made the best of our way out to sea, and then shaped our course south-westwards along the ice, for the South Greenland whaling-grounds.

June 16.—Lat. $75^{\circ} 50'$, long. $6^{\circ} 9'$ W. Water dark blue and clear; temperature at the surface, 31° . At a depth of about forty fathoms, with a tow-net, I secured a large quantity of the Copepod, *Calanus finmarckicus*, with their alimentary canals filled with diatoms. This would seem to show that (even when the water at the surface is blue and clear) diatoms may exist in abundance at a trifling depth.

June 17.—Lat. $75^{\circ} 30'$, long. $10^{\circ} 30'$ W. The water remains blue and clear, the temperature being 30° . About noon we approached the first field of ice, behind which a Whale was discovered feeding. Two boats left the ship and pulled towards it. The water being very clear, the Whale must have seen the boats at the surface, for it was observed to approach them very cautiously, as if conscious of danger, and with the intention evidently of examining them. At first only the eddy or swirl

caused by the action of its caudal fin appeared at the surface, but soon afterwards the animal itself—although still under water—became visible, moving towards one of the boats, immediately under which, at the depth of only a few feet, it afterwards for some time lay motionless, one of its eyes being directed upwards. Finally, raising the tip of its upper jaw a few inches above the surface, with its body depending downwards and its soft and unprotected back under water, it moved slowly round the boat at the distance of only a few feet from its side. When opposite the boat's bow it suddenly raised its back above the surface and descended: before it disappeared, however, it was harpooned. The animal undoubtedly had seen the harpooner directing the harpoon-gun towards it, and, taking alarm, had endeavoured to escape. In the course of an hour or so this Whale was duly killed, and, the ship having been anchored to a field of ice, was afterwards flensed. The following are a few notes which I made:—

Sex.—Male.

Colour.—A deep velvety black throughout, with the exception of a little white on the under surface of the lower jaw extending backwards from the tip, and a greyish appearance at the rump where the lobes of the tail commence to expand outwards.

Measurements.—From tip of lower jaw to articulation of condyles, 13 ft. 6 in.; to umbilicus, 22 ft.; to preputial orifice, anterior end, 22 ft. 6 in.—posterior end, 26 ft.; to anus, 28 ft. 6 in.; to median cleft of caudal fin, 40 ft. 6 in. Breadth across the under surface of lower jaw, 8 ft.; between the fins, 7 ft. 3 in. Length of pectoral fin, 6 ft.; breadth, 3 ft. 8 in. Length of longest plate of whalebone, 3 ft. 4 in.; breadth at the base, 10 ft. Number of plates of whalebone, 579.

The opening of the ear, which is somewhat difficult to discover, and which I have sometimes searched for in vain, was in this Whale 16" behind and slightly below the posterior canthus of the eye,—a minute opening, as in other Cetaceans. I did not succeed in examining the stomach, but the intestine I found contained reddish matter, similar in appearance to the fœces I obtained from the last Whale we killed. By comparing the measurements just given with those of the female Whale killed on May 26th, it will be seen that there is no marked proportionate difference in the length of the head with relation to the extreme length of the body between the two sexes. In both Whales the

head measured, as nearly as possible, one-third of the length of the whole body.

From the 18th to the 29th we were engaged in cruising south-westwards, over the best and usually the most productive parts of the South Greenland fishing-grounds, between lat. 72° and 73° and long. 15° W. The coast of Greenland was frequently in sight, the tops of the mountains dipping on the western horizon. The ice, which was mostly in the form of large floes, was only newly opening out, and hence the colour of the water, which was everywhere uniformly clear and blue. In accordance with the scarcity of vegetable life there was a general want of animals, a solitary "Finner" and an occasional school of Narwhals being the only representatives of the Cetaceans. A few notes which I made concerning the habits of the Blue Fin-whale,* *Balænoptera Sibbaldi*, may be of interest:—

Several of these Whales were observed feeding at the edges of the floes. When feeding under such circumstances a sinuous course is pursued, the animal being alternately under the ice, in search of its food, and outside the edge of the floe, where it approaches the surface for the purpose of breathing. The period under water in one instance was eight minutes, during which the Whale had moved along the edge of the ice about a quarter of a mile before again appearing at the surface to breathe, while the period at or near the surface was about three and a half minutes, during which it rose to the surface at regular intervals of twenty-six seconds, blowing once on each occasion. While feeding in this manner, owing to the distance performed horizontally, the depth to which the animal descends must be trifling; in fact, the animal is probably obtaining its food immediately under the surface of the ice. This view is supported by several facts. On several occasions I have noticed an immense number of Crustaceans, of the genus *Gammari*, collected under the surface of the ice; in the case of a piece of ice being displaced, by contact with the ship, they are frequently exposed. Again, a field of ice having become broken by the action of swell and intersected by narrow cracks, great numbers of small fishes, belonging to the

* To this animal, the Blue Whale of the Norwegians (see Mr. Cock's remarks), the general term "Finner" is applied by Scotch writers without any restriction. The terms might be advantageously combined. I propose the name adopted in the text, "Blue Fin-whale."

species *Gadus fabricii*, are found frequenting the cracks. From these several facts it seems probable that those forms preyed upon by the Whalebone Whales collect under the ice, where, in the darkness necessarily prevailing, the retreat is rendered more secure. It must be remembered that the ice, being acted on by the wind, may be drifting through the water, so that while the forms collected under its surface receive the maximum amount of safety, a supply of food is provided in the form of vegetable organisms contained in the ever-changing water. The Blue Fin-whales appeared to have entered the ice from the S.W., several being observed coming up from that direction. One, which passed near the ship, was going N.E. towards a floe, a corner of which lay across its path. I was anxious to notice whether it would pass under the ice which was only about one mile broad, and so reach the water on the other side without swerving from its path, —a feat which could easily have been performed by *Mysticetus*. Continuing its course to the eastward, this Whale dipped below the ice, heading towards the open water on the other side. After an interval of eight minutes the animal again appeared, on the same side of the floe, but half a mile farther to the eastward, having found it necessary to swerve to the right in order to regain the open water. After blowing eleven times it again turned to the N.E., and by this time, having rounded the point of the floe, continued its course in that direction. Meeting with no indication of the presence of *Mysticetus* we retraced our steps northward, and on reaching the ice in lat. 75° we again fell in with Whales in the same locality as before. The following extracts from my Log may assist in explaining our proceedings:—

June 28.—Lat. $75^{\circ} 14'$, long. $9^{\circ} 28' W$. Water clear and blue; temperature 33° . Several "Finners" seen in the morning, evidently feeding, reappearing at intervals of about twelve minutes, without shifting ground. On proceeding westwards for a few miles towards the floes, where the ice was closer, we encountered great numbers of Narwhals and also two Greenland Whales. The latter were both moving north-eastwards; the first was only seen once, while the second was chased by our boats for five hours. Partly owing to the clearness of the water, and partly owing to the smoothness of the sea, the weather being calm, the boats could not succeed in approaching it, and so the chase terminated unsuccessfully. It was interesting to notice how, on the near approach of the boats, its blowing became more audible

and was sent higher into the air, its speed at the same time becoming accelerated; how when, being evidently alarmed by the noise of the oars, the animal sought shelter amongst closer ice, until being freed of its pursuers it again ventured into open water, and, reaching a body of compact ice, finally disappeared from view.

July 1.—Lat. $74^{\circ} 37'$, long. $11^{\circ} 00'$. Clear blue water all day; temperature, 33° . A great abundance of animal life. several "Finners" and "Whales" being seen; also many Bears and great numbers of Narwhals. Two large Whales were seen, and chased with most unfortunate results. When discovered from the Crow's Nest, one was feeding in open water, the other at the edge of an adjoining floe, in the same manner as the Blue Fin-whale already described, remaining, however, under water for a period of twenty-five minutes. The Whale feeding in open water, seeing one of the boats approaching, immediately became alarmed and made off towards the floe where the other Whale was feeding; we could see it all the while, swimming a few feet under water, with one of its eyes directed upwards, and the eddy caused by the action of its tail breaking out at the surface. Meeting the other Whale, it also became alarmed, and both set off together towards the N.E., swimming with great rapidity. The boats, on returning on-board, reported a quantity of blood-red crustaceans at the surface, near where the Whales were feeding, presenting, one of my informants said, a remarkably striking appearance when viewed against the submerged parts of the ice. I received two specimens, one of which was still alive; it was about an inch in length, exclusive of the antennæ, which were remarkably long and delicate.* Notwithstanding the clearness of the water, and the evident absence of vegetable life in the surface waters, Narwhals were very numerous, and, these animals being stationary and evidently feeding, it followed that those forms constituting their food were also abundant. The stomachs of two females which we killed contained cuttlefish remains, most probably *Gonatus fabricii*, a cephalopod about a foot or so in length, of a bleached or etiolated appearance, rarely or never found at the surface, hence probably living at a consider-

* Through the kindness of Mr. John Murray, of the 'Challenger' Commission, Prof. Sars has identified this crustacean as *Hymnourdora glacialis*, Bach., which he regards as a semipelagic form.

able depth. Besides cuttlefish remains, I found an abundance of blood-red crustaceans, mostly *Pasiphaë tarda*, but also a few belonging to the same species as those just mentioned as being found at the surface (*Hymnourora glacialis*). These crustaceans, especially *Pasiphaë*, have been present in nearly all the Narwhals' stomachs I have examined, along with the cephalopod *Gonatus*. The blood-red colour of the crustaceans, characteristic of abyssal forms,—the fact of their being found in the Narwhal's stomach along with *Gonati*, which, as I have already said, seem to live at a considerable depth,—all tend towards the conclusion that the Narwhal penetrates to a considerable depth for its food. The occurrence of blood-red crustaceans at the surface, I may add, is very unusual in these seas. Of the two Narwhals, one was non-gravid, while from the other I removed a foetus measuring 5 ft. 2 in. in length, probably mature.

July 4.—Lat. $74^{\circ} 50'$, long. $12^{\circ} 9' W$. Water clear and blue; temperature at the surface, 32° . In the morning a large Greenland Whale was discovered in a "bight" formed by the floes. Several Blue Fin-whales were feeding near, their movements forming a marked contrast with the graceful but less active movements of their congener. This Whale, the last we saw during the season, was eventually harpooned, but, after some 400 fathoms of line had been drawn out, the harpoon drew.

(To be continued.)

NOTES ON THE OCCURRENCE OF PALLAS'S SAND GROUSE IN LANCASHIRE.

BY ROBERT J. HOWARD,

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IN 1888, as in 1863, Lancashire was favoured with a visit from this interesting species; the second invasion, however, was on a larger scale, with a correspondingly heavier death-roll than that of twenty-five years ago. The first arrival of the birds, at almost the same date as in 1863 (as regards Lancashire, within two days of the same date), is remarkable. In this report I propose to deal with occurrences which have come within my own knowledge in the county of Lancashire, excepting the Furness district, which the Rev. H. A. Macpherson has included

in his report on the subject, published in the 'Transactions of the Cumberland and Westmoreland Scientific Association.'

May 20th.—Eight were seen to alight on the moss about a mile north of St. Michael's-on-Wyre. On the following morning Cuthbert Baines, a farm-labourer, shot four of them (two males and two females); the rest flew N.W. These are the birds referred to by Mr. Hugh P. Hornby ('Field,' June 2nd), who writes me that he was misinformed as to the number of birds in the flock, and the date when his were shot, and that his notes are consequently incorrect on these points.

May 25th.—One seen flying across Tarleton Moss, against a strong east wind, by Henry Cookson.

June 1st.—Two males and one female shot out of a flock of seven on St. Michael's Moss, by C. Baines. One male and one female in Mr. Francis Nicholson's collection; one male in Mr. W. B. Wardle's collection.

June 2nd.—A flock of about twenty seen, by a party of pigeon-shooters on the Manchester Racecourse, flying from the direction of Trafford Park; the birds, after passing over the course, wheeled and returned to the park.

June 3rd.—Three males shot out of a flock of twenty on Rawcliff Moss, by John Taylor; the remainder of the birds flew N.W., and were probably the seventeen which the Rev. H. A. Macpherson says were seen on June 11th on the north end of Walney. One in Mr. F. Nicholson's collection; one in the Blackburn Museum; one in my own collection.

June 7th.—A solitary female shot on St. Michael's Moss, by C. Baines. In my own collection.

June 30th.—One seen near Blackstone Edge Reservoir, by James Stancliffe, gamekeeper.

September 3rd.—One seen on Tarleton Moss, by Henry Cookson. This bird was flying west along the same line as the one which he saw on May 25th; but it was travelling in the opposite direction.

From the above list it appears that in Lancashire fifty-nine Sand Grouse have been seen and eleven (seven males and four females) killed. It is quite possible, however, that the flock of twenty seen near Manchester on June 2nd was the same as that observed on Rawcliffe Moss, forty miles N.W., on the following day, for most of the birds which escaped the gun flew off in a

north-westerly direction. All those birds referred to, with the exception of that seen on Blackstone Edge, were met with in the low-lying district of West Lancashire, chiefly on the moss-land. Those seen near St. Michael's were partial to oat-fields, and were seldom, if ever, observed on the old grass-land. Cuthbert Baines told me that the birds were wild, and would not allow him to approach within 150 yards in the open; he had to creep down the moss-ditches to get within shot. The birds rose quickly the instant his head appeared above the edge of the ditch, and would not permit him to take the "pot" shot invariably adopted with Dotterel. After being flushed, whether shot at or not, they usually flew a few hundred yards and returned in a short time to the same field; in this respect, as well as in their partiality for oat-fields, resembling Dotterel. They do not carry away much shot; all were killed with No. 10 at about thirty yards distance. On September 6th I examined five birds in the Western Aviary at the Zoological Society's Gardens. The gait is such as one would expect from the shape of the feet, and reminded me of that of a rat.

These Sand Grouse would, I think, have little difficulty in finding an abundant supply of suitable food on our moss-land. In addition to grain (any kind of which it appears the Sand Grouse will eat), most of the moss-land is full of the seeds of goose-foot and various species of knot-grass (*Polygonum*); seeds of the latter, with germinating power unimpaired, are found buried several feet in the peat, and are constantly being brought to the surface as the land is worked. Seeds of the goose-foot (*Chenopodium album*), a very common weed, were found in the crops of the Lancashire-killed specimens, and it appears that the seeds of a nearly-allied plant, *Agriophyllum gobicum*, formed the bulk of the food of the Sand Grouse in Central Asia. Six of the birds killed at St. Michael's have passed, in the flesh, through my hands; and the contents of the crop of the other were sent to me by Mr. Nicholson. I forwarded the crops and gizzards to Mr. Robert Holland, Frodsham, who very kindly furnished me with the following particulars:—

1. Crop: red clover, a few seeds of Italian rye-grass, and knotgrass (*Polygonum persicaria* or *lapathifolium*). Gizzard: half the bulk, small fragments of white quartz; seeds, knotgrass, red clover, and alsyke.

2. Crop: red clover, a few seeds of Italian rye-grass and knotgrass.
3. Crop: same as No. 2, with a few seeds of mouse-eared chickweed.
4. Crop: knotgrass and red clover, a few seeds of trefoil, Italian rye-grass, perennial rye-grass and meadow-fescue. Gizzard: five-sixths of bulk, small fragments of white quartz; seeds, knotgrass, goose-foot, alsyke, and Italian rye-grass.
5. Crop: red clover, Italian rye-grass, knotgrass, and goose-foot.
6. Crop: same as No. 5.
7. Crop: knotgrass, goose-foot, mouse-eared chickweed, Italian rye-grass. Gizzard: one-third of bulk, white quartz; seeds same as crop.

Plumage, dimensions, weight, &c.:—

1. Male;	length, 16·9;	wing, 9·4;	central tail-feathers, 7·6;	weight, 9½ oz.
2. Female;	„ 15·1;	„ 8·2;	„ 5·2;	„ 10½ „
3. Male.				
4. „	„ 15·2;	„ 8·7;	„ 6·2;	„ 9¾ „
5. „	„ 16·1;	„ 9·1;	„ 7·5;	„ 9¾ „
6. „	„ 16·3;	„ 8·55;	„ 6·3;	„ 9 „
7. Female;	„ 13·0;	„ 8·3;	„ 4·0;	„ 9 „

The birds were in fair condition; the female, No. 2, was very fat—hence her weight, for she had little in her crop. The eggs in this bird and No. 7 were about the size of No. 4 shot. The testes in the male were well developed; in No. 1 the left testicle was $\cdot48 \times \cdot22$, right $\cdot42 \times \cdot3$; in No. 5 the left was $\cdot42 \times \cdot32$, right $\cdot26 \times \cdot26$. The plumage was clean, though bleached and worn. The birds which passed through my hands had cast a few of the inner primaries and the secondaries, giving the wing a very peculiar indentation. In No. 1, the new primaries (the ninth and tenth) project about one inch beyond the coverts, are lavender along each side of the shaft, gradually shading to black towards the edges and tips, the edges rich buff $\cdot2$ wide; the new secondaries rich buff, with black stripe $\cdot3$ in width, along outer web, leaving a narrow border of buff; one of the central rectrices, new, 4 in. long. No. 4 has the colours the brightest of any I have seen. Abdominal band rich velvety black; pencillings of chest-band very clear; three inner primaries moulted. No. 7, female, is the most forward in moult. A few scapulars, one of the elongated tail-feathers, 3·8 in. in length; the secondaries, and the three inner primaries with their coverts, new; the eighth and ninth primaries almost full-grown; the

tenth is hidden by the coverts. The black on the new primaries, not so well defined in outline as in those of the males, giving the centre of these feathers a mottled appearance. Abdominal band dark umber; gular band distinct; no trace of chest-band. This is the only bird which shows any new contour feathers.

I have not met with a live Sand Grouse in Lancashire; but on the 12th September I had the pleasure of seeing the flock of seventy-three at Morston, Norfolk, referred to by Mr. Southwell (Zool. 1888, p. 446). The birds were put up at least 600 yards from the place where we stood, and passed within 300 or 400 yards of us. We could hear the call-notes soon after the birds rose, but it was a difficult matter to distinguish the note on account of the number of birds calling at the same time. Shortly afterwards, however, two birds passed us within 150 yards; we then put up three, one, and thirteen,—portions of the large flock which had broken up,—each bird calling as it flew. We all thought the note was very like the “chuck” of the breeding Snipe, with a slight whistling intonation, as described by Mr. Southwell (Zool. 1888, p. 453), uttered at intervals of about a second. The note has a more decided short “chuck,” and less of the whistle than has *Tringa canutus*.

I have not heard that these birds have made any attempts to nest in the county. A thin-shelled, abnormally-shaped egg, found in a field on St. Michael's Moss, which the Sand Grouse had frequented, is pronounced by Mr. Edward Bidwill, to whom I forwarded it, to be that of a Lapwing.

My best thanks are due to Mr. Hugh P. Hornby, Mr. Francis Nicholson, Mr. Harry Hoyle, and Mr. J. Moorcroft for information kindly supplied, and also to Mr. J. H. Gurney, jun., and Mr. T. Southwell for the kindness shown me during my visit to Norfolk, when I had an opportunity of seeing something of the Sand Grouse in a state of nature.

PALLAS'S SAND GROUSE.

REPORTS FROM THE CONTINENT.

HELGOLAND.—Herr P. C. Reisners, the proprietor of the restaurants on the Dune, says the first pair were shot on the 15th of May, the last two on the 13th of June, 1888; altogether he shot about fifty specimens. The birds came in large flocks which were estimated at forty, sixty, and once at eighty head. The first arrivals were seen in April, and the last four specimens on the 17th of July. Most flocks flew to the west, and only one to the south. ('Der Zoologische Garten,' August, 1888 p. 233).

HOLLAND.—According to Dr. A. C. Oudemans, the first was seen in Holland on the 18th of May. It had flown against a telegraph wire at Loosduinen, near the Hague, and was killed on the spot. It was a fine male, but the front of the neck was almost denuded of feathers by the concussion. Afterwards these grouse were met with in various places, both in the provinces and on the islands of Texel, Vlieland, Terschelling, Ameland, &c. It is curious how many were killed by flying against telegraph wires, which may be due to the fact that the birds generally fly at a height of from five to eight metres from the ground. Hitherto eggs have not been met with out of doors, but it is said that a hen laid three eggs in captivity at Amsterdam. The number of birds observed varied from two to four, and from twenty to thirty, to hundreds, on the islands of the North Sea. Eight were brought to the Zoological Gardens at Amsterdam, five of which soon died. Dr. Oudemans bought a male from Texel for the gardens at the Hague, which also died after six days. This bird moped from the first, although it fed ravenously on seeds, green food, and ants' eggs. ('Der Zoologische Garten,' August, 1888, p. 234).

ITALY.—The first were shot on the coast at Fano, on the 1st of May. About the middle of May a male bird, dead and decomposed, was found in the province of Mantua. About the same time one was caught by hand near Trieste, and was kept alive at the Natural History Museum there. Two specimens were caught at Montagnana, in the province of Padua, one of which was slightly injured, and was kept alive in a large cage

in the house of Signore Dal Fiume, being fed on millet and other seeds. The second specimen was eaten. A pair was shot at Santareangelo; the stomach of the male contained seeds and grains of sand, but that of the female was empty. The flesh was well-flavoured, but tough. (*Tom. cit.* p. 235).

FRANCE.—A great number of Sand Grouse were seen west of Dunkerque, in the direction of Mardyck. Those which were killed were sold to different museums, and others were kept alive in cages. There are two stuffed specimens at Carpentier's, the gunmaker, at Dunkerque. Sand Grouse were also seen on the 28th of May, on the Dunes of Noirmontier, Dieu, and Olonne, in La Vendée (several hundreds, of which three were killed); on the 31st of May, near Calais, ten specimens, one killed; at the beginning of June, near Nantes in Brittany, and in the middle of June, in the north of the Landes. (*Tom. cit.* p. 236.)

SCHLESWIG.—First observed in Schleswig, on the "Schubyer Fields," between the middle and end of April. At this time they did not remain permanently, but seemed as if making reconnaissances in flocks of from twenty to thirty birds, and were only occasionally to be met with. After the birds were protected by the Government, the large estate owners, sportsmen, and others who were interested in birds took the new comers under their special protection, hoping that they might obtain a new game-bird, should it become acclimatized. They were left unmolested, and all shooting and unnecessary disturbance was avoided in their neighbourhood. These birds do not appear to be so shy in their nature as Partridges, and they soon gained confidence, and took possession of a tract of meadows, pastures and heaths which, perhaps, were not very unlike the steppes. Flocks of the size mentioned, were noticed until the month of May was far advanced. The birds were so tame that they allowed themselves to be approached within a few paces; they sat quite still, and could be readily observed. Several instances of their breeding were noticed in May and June. Nests were found in grassy places (mostly in meadow land) containing one, four, five, seven, and nine eggs. [May not these have been nests of the Landrail?—ED.] The meadows lie high, and are dry, rather than damp; they are not marshy meadows on low-lying rivers. Nests of eggs were also found in grassy places

on the heaths. The nests are like those of the Lapwing, being merely a thin layer of grass stems, on which the eggs are laid. These are blotched with brown, and resemble the eggs of the Woodcock. The nests are arranged in groups, so that we may regard the birds as gregarious during the breeding season, which is rarely the case with other birds, and they were often seen sitting in pairs on the eggs, when they were quiet, and easily observed. During the hay harvest, from the end of June to the middle of July and later, young Sand Grouse were often seen while mowing was going on. Incubated eggs and deserted nests were also found, but were not further observed. The wet and cold summer must have been very unfavourable to the breeding of the Sand Grouse; for abandoned Partridges' nests, containing from fifteen to twenty eggs, were frequently observed. The Raven was found to be an enemy to the Grouse, as well as to the eggs and young. Owing to the presence of carnivorous vermin, no weak or sickly specimens were found, as was the case in other places. The Sand Grouse were seldom seen in the corn-fields, which leads to the inference that they generally feed upon grass-seeds. It was difficult to continue to observe them, owing to the size and extent of the plains, and also on account of the rainy summer which prevented many observations on these birds which might have been of importance. They finally congregated in large flocks about the middle of September, when two flocks of forty and sixty birds were seen several times. The larger size of the flocks in autumn, is probably due to the young birds having joined them. The young and old birds may be distinguished from each other in the flocks, as the former are not full-grown. Although the flocks have assembled a long time, as if they were on the point of migrating, the birds are still here (Nov. 26). They would probably survive a mild winter; but it is doubtful whether they would live through so severe a winter as the last. The note of the bird is not unlike the hoarse cry of the Sea Gull, but not so piercing.* They constantly utter it when on the wing. (Copied from the

* "Die Stimme der Vögel ist dem heiseren Schrei der Möven nicht unähnlich aber nicht so durch dringend." This is a remarkable statement, and conflicts entirely with what has been written of the note of this Sand Grouse by English ornithologists.—ED.

'Schleswigschen Nachrichten,' in the 'Bremer Nachrichten,' No. 329, for 27th November, 1888).

LIVONIA.—I beg to inform you that a Sand Grouse was shot on the 30th October, 1888, in the district of Zarnau, in the province of Wolmar, in Livonia, and was brought to me. At the time the ground was covered with some inches of snow, and was already a little frozen; and the bird had probably been driven by hunger to a farm-yard where a farmer shot it, thinking because it flew very swiftly that it was a small Hawk, of which the people are very much afraid. The crop contained a large quantity of grains of barley and rye, and the bird was not particularly lean. No other Sand Grouse have been seen here this autumn so far as I know.—HARRY VON BLANKENHAGEN (Oberforster, Zarnau, in Livonia. ('Beilage zur Illustrierten Jagdzeitung,' Leipzig, 21st December, 1888, p. 144).

SILESIA.—Sand Grouse have again been seen in the neighbourhood of Leobschutz. While the workmen of Amtsvorsteher Heidrich-Zauchwitz were spreading manure, they found three dead birds behind a manure heap. At first they thought they were Partridges, but when they examined them more closely they perceived that the birds were quite unknown to them, and brought them to their master as something strange. They proved to be Sand Grouse. The cause of death could not be exactly ascertained. Anyhow, the birds were not starved, for they were in pretty good condition. No signs of external injuries were visible. ('Beilage zur Illustrierten Jagdzeitung,' Leipzig, 21st December, 1888, p. 144).

THURINGIA.—The Sand Grouse appear to have now (December 21st) entirely disappeared from Thuringia, for all the local papers concur in saying that no more have been seen anywhere. (*Loc. cit.*)

BERLIN.—Two pairs of Sand Grouse in one of the aviaries at the Berlin Aquarium are well and lively, and very fat. They have been accustomed to captivity since July last, when Herr Schultze, architect, of Hanover, obtained them on his estate in the Island of Amrum, in the North Sea, feeding them on hemp seed and buck-wheat. They were sent to Berlin carefully packed, and have since lost much of their original shyness. Our Partridge is considerably handsomer both in form and colour. These are, perhaps, the only Sand Grouse in Germany at present (December 28th). The others have already gone back to Tar-

tary. [This is extremely doubtful. ED.] They did not breed here, which proves that they are only visitors. ('Beilage zur Illustrierten Jagdzeitung,' December 28th, 1888, p. 157).

WESTPHALIA. On the 30th November, 1888, a covey of fifteen birds were seen on the preserves of the estate of Niesen.—C. BRITFISCH (Warburg, Westphalia).

SAXONY.—During two battues on the Alschlebener and Klietzer estates, in the province of Saxony, during last December, a single Sand Grouse was shot in each. ('Der Weidmann, Blätter für Jäger und Jagd freunde,' 2nd January, 1889, p. 121.)

SWEDEN AND NORWAY.—Various accounts have been received from Sweden and Norway about the Sand Grouse. It is said that these visitors have been seen in several places in the province of Halland. Since the harvest was gathered, large flocks have remained in the neighbourhood of Warbeg. In Norway, specimens have been shot on the eastern side of the Glommen-Berg in Hedemarken. It has also been stated that a flock of from ten to twenty individuals was observed at a great height in the mountains at Taundalen (1150 feet above the sea).—B. DAHSE (Ystad, 16th December, 1888).

THE SAND GROUSE PROTECTION ACT, 1888.

THE following is the text of the Sand-Grouse Protection Act, which received the Royal assent on the 25th December last:—

"An Act for the better Protection of the Sand Grouse in the United Kingdom. 51 & 52 Vict. ch. 55.

"Whereas it is expedient to provide for the protection of the Sand Grouse, in order that it may, if possible, become acclimatised in the United Kingdom:

"Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

"1. Any person who shall, after the first day of February one thousand eight hundred and eighty-nine, and before the

first day of January one thousand eight hundred and ninety-two, knowingly or with intent kill, wound, or take any Sand Grouse, or shall expose or offer for sale any Sand Grouse killed or taken in the United Kingdom, shall, on conviction of any such offence before any justice or justices of the peace in England and Ireland, or before the sheriff or any justice or justices of the peace in Scotland, forfeit and pay for every such bird so killed, wounded, or taken, or exposed or offered for sale, such sum of money not exceeding one pound as to the said justice or justices shall seem meet, together with the costs of conviction.

"2. This Act may be cited as the Sand-Grouse Protection Act, 1888."

On comparing the text of this Act with that of the Bill as originally introduced,* it appears that the intention of its promoters was, very properly, to give effect to the Act the moment it was passed, and the clause originally proposed was "between the time of the passing of this Act and the first day of January, 1892." This was altered (as we think, very unwisely) to the wording above given, the result being, as might have been expected, that many Sand Grouse have been killed since the Act was passed, apparently because unscrupulous persons have been anxious to procure specimens before it should become illegal to do so. If there was to be any legislation at all on the subject, the pity is it did not come sooner. It is hardly to be expected that any good will now result from it.

THE ELECTRIC ORGANS OF FISHES.

UNDER the auspices of the "Glasgow Natural History Society," at the Inaugural Meeting of the present session, Professor Cossar Ewart gave an interesting lecture on this subject. He said there were few, if any structures in the whole, realm of nature which, in addition to perplexing and puzzling the naturalist, had attracted more general attention than the

* The Bill was prepared and brought in by Mr. Sydney Buxton, Sir George Trevelyan, Lord Charles Beresford, Sir John Lubbock, Mr. G. Osborne Morgan, Sir Henry James, Mr. Richard Power, Sir Edward Birkbeck, and Mr. Broadhurst.

electric organs of fishes. Aristotle seemed to have pondered long the peculiar force by which the electric ray numbed the fishes that came within its reach, and Darwin after long and careful consideration, came to the conclusion, that the electric organs offered a special difficulty to his theory of natural selection. And although, as the result of numerous investigations, a considerable increase had recently been made to our knowledge of these organs, it was still impossible to account for their origin, in some cases to offer an opinion as to their function, or even to say whether they were progressive structures, or mere useless vestiges. The Torpedo and other electric fishes fascinated the Greeks, and to a less extent the Romans, and held their ground during the dark ages. One of the most noteworthy facts about electric organs was that they were only found among fishes, and that although there were hundreds of different kinds of fishes, there were practically only three kinds that were known to have electric batteries sufficiently powerful to be of any evident use. These were *Malapterurus* of the Nile and other African rivers, the *Gymnotus* of South America, and the Torpedo found at times in our own waters, and in considerable numbers in the Mediterranean and the Atlantic. Others, in which electric organs were known to exist, were the once sacred *Oxyrhynchus* of the Nile, and the Skates and Rays which abound round the coast of Scotland. The *Malapterurus* was a quaint-looking fish, with a fatty dorsal fin like the Salmon, and six long barbules around the snout. It was said sometimes to reach a length of four feet. In this fish the electric battery was in the form of a continuous subcutaneous jacket or tunic, which invested the whole body, with the exception of the head and fins. It consisted of a countless number of minute cells, from which electricity was thrown off at will. The *Gymnotus* was a soft-skinned, sluggish creature, with small stupid-looking eyes, flattened back, and long ventral fin. It sometimes reached a length of six feet, and as the electric batteries occupied nearly two-thirds of the entire fish, one could easily understand how much it was dreaded by the natives of the Orinico region, and how ordinary fishes gave the Electric Eel a wide berth.

The *Gymnotus* had four batteries—two large and two small—on each side of the body, supplied by about 200 pairs of

nerves. The batteries were so powerful, that a shock from a large active fish was strong enough to strike down a man, and numb away his consciousness for several hours. The Torpedo was of special interest, because we were beginning to understand all the steps through which its organ had passed during its long and gradual evolution. Some of the species attained a great size. There was one, the Giant Torpedo, over four feet in length, which, when cast ashore at Cape Cod, was said often by its unexpected shocks to strike down the unwary fishermen when they attacked it with their harpoons and boathooks. The shock of the common British Torpedo was sufficiently strong to kill a duck, and when the organ was connected with a telephone the discharges first produced a croaking sound, but as the fish got excited each discharge was accompanied by a pronounced groan. The electricity discharged from the Torpedo's batteries behaved like ordinary electricity, rendering the needle magnetic and emitting sparks, and it might even be used in charging a Leyden jar. But it should be specially noted that the living battery of fishes differed from the ordinary batteries. A Leyden jar or a voltaic pile had no influence on the electricity it contained, while the electricity of the Torpedo was entirely under the control of its will, the Torpedo refusing to give a shock at one time, but readily discharging its batteries at another. What was perhaps still more remarkable, there were two large lobes in the brain of the Torpedo which regulated the production, storage, and discharge of the electricity. These electric lobes were composed of numerous giant nerve cells, from which numerous nerve fibres extended to pass direct to the batteries. When the electric lobes were destroyed, or the nerves passing from them were divided, the Torpedo was rendered as helpless as an engine without steam.

Prof. Ewart then proceeded to describe the structure of the electric organ of the Torpedo. He stated that the battery consisted of an enormous number of columns or prisms—in the ordinary Torpedo from 400 to 500, in the American about 1000, making in the two batteries 2000 columns for storing electricity. In each of the 500 columns there were about 600 electric plates, so that in the ordinary Torpedo there might be about 300,000 electric plates altogether, and in the Giant Torpedo, some 500,000. These plates were supplied with an enormous

number of nerve fibres, so fine, and dividing more and more, that with the highest power of the microscope it was impossible to trace them. Each of these tissues was connected with the electric lobes in the brain, and when cut across, were seen to be made up of a large number of nerve cells.

The lecturer described in detail the structure of the electric plate, and went on to say that the electric organs claimed special attention, not only because of their remarkable structure and still more remarkable properties, but because their very existence was a mystery. Darwin found the electric organs a special difficulty to his theory of natural selections, for two reasons—he was able neither to understand their individual nor their ancestral history. That the electric organs had been gradually built up as the Torpedo and Electric Eel became more and more specialised, Darwin had no doubt; but he was unable to account for their origin by his law of natural selection. And before proceeding he emphasised the difference between evolution and natural selection. We spoke of the fact of evolution, but the *theory* of natural selection; for while all naturalists now agreed that animals and plants had been evolved, there was still some diversity of opinion as to the method by which the evolution had been effected. In reference to any plant or animal, it would be said by most naturalists that it was slowly evolved out of a mass, originally shapeless, of growing protoplasm, by means of natural selection operating on fortuitous variations. As to the guiding hand, science must be absolutely speechless. In asking science to tell us what was the cause of causation, we were asking her to cross an impassable channel,—to pass from the domain of fact to that of belief,—a feat, which if essayed, must inevitably end in failure.

When, thirty years ago, the 'Origin of Species' was launched on its wonder-working career, nothing was known of the ancestral history of the Torpedo. Now the position was altered, and he was able to tell them not only what the Torpedo's organs had been derived from, but also to trace every step in their life-history. To redeem his pledge, he went on to direct attention to the so-called "pseudo electric" organs of Skate. He pointed out that fifty years ago no one ever suspected that the Skate was possessed of electric batteries, and that until a few months ago naturalists would probably have

expressed surprise had it been suggested that there was considerable diversity in the form and structure of the electrical apparatus of the various members of the Skate family. The discovery of the existence of the electric organ of the Skate was due to Dr. Stark, of Edinburgh, who read a paper on the subject before the Royal Society of Edinburgh in 1844, but having been labelled by naturalists "pseudo electric," it had been until quite recently neglected alike by physiologists and naturalists. But the Skate's organ was coming to the front again on account of the light it threw on the development of the powerful battery of the Torpedo. The discharges from the Skate's batteries, though weak, and, as far as had been ascertained, useless, behaved exactly like the discharges from the Torpedo. The Skate did not keep its electric battery at each side of the gill like the Torpedo, but carefully tucked away in the tail.

He described at length the structure of the electric organ of the Skate. Instead of consisting of a series of plates, it consisted of a series of discs, or cones, fitted into each other like thimbles, and forming a long electric spindle. Each disc consisted of several distinct layers. The first layer, into which all the nerve fibres pass, was not unlike the electric plate of the Torpedo. Altogether in the electric organ of the Skate there might be 25,000 discs, or 50,000 in the two electric spindles. In other Skates, instead of the discs, there were numberless cups, each cup having led into it numerous nerve fibres. He further showed that in other instances the electric organ was composed of muscular cups; and in the young of the Skate the process of development of the muscular tissue into the electrical organ was traced.

In the same way, he said, the electric organ of the Torpedo, notwithstanding its extreme complexity and remarkable powers, had been formed out of ordinary muscular fibres. For some inscrutable reason, the fibres of certain muscles concerned in moving the jaws of the ancestral Torpedoes became more and more modified, generation after generation, until they entirely lost their original function, and were so profoundly altered in structure that it was no longer possible to recognise in them the remotest resemblance to muscular tissues. But though he had been able to show that the Torpedo's electric organs had

been thus evolved, he had to admit that he had only dealt with one of the difficulties—he had said nothing of the manner in which the transformation had been effected.

NOTES AND QUERIES.

The late Churchill Babington, D.D., F.L.S.—A distinguished scholar and an excellent naturalist has just passed away, at the age of 67, in the person of Dr. Churchill Babington, Rector of Cockfield, Suffolk. Although best known for his classical and archæological attainments, and his skill as a palæographer, his labours in the fields of Zoology and Botany were by no means unimportant. So long ago as 1842 he contributed to Potter's 'History of Charnwood Forest,' an Appendix on the Botany and Ornithology of that district, and many years were subsequently occupied in the preparation of a volume on the Birds of Suffolk, which appeared in 1886, and was reviewed in 'The Zoologist' for January, 1887. It is to be regretted that he has not lived to see the publication of his projected 'Flora of Suffolk,' the prospectus of which has for some time been issued. He was perhaps more of a botanist than a zoologist, his name being familiar to readers of the 'Journal of Botany,' and was an authority on Lichens, being a contributor on that subject to Hooker's 'Flora of New Zealand.' Yet his love of animals, and especially of birds, was amply apparent in the large and interesting collections which almost filled his charming country rectory. Those who have visited him there will not easily forget the kindly hospitality with which he welcomed his guests, and the readiness with which he exhibited his treasures, regardless of the trouble involved by searching for specimens and looking up references which he thought likely to be of interest. To very many the news of his death, which occurred on Jan. 13th, will bring "the quiet sense of something lost." *Requiescat in pace.*

Game and Wildfowl in the Paris Markets.—In the Annual Report of the Municipality of Paris upon the consumption of food in the capital during the past twelvemonth, the particulars as to the sale of game and poultry are somewhat striking, notably the appended table, which shows how many head of game were sold in the markets, and what proportion were French, and what foreign. With the exception of Hares from Germany, the figures show an increase for the present year, and the report states that the reason why there were fewer Hares from Germany was, that it was found more profitable to send them to England. But there was a marked increase in the number of Pheasants and Partridges from Germany,

and the prices fell to about three shillings and two shillings each, which is cheap for France. Most of the Deer and Wild Boar came from Germany, and averaged tenpence a-pound. The Wild Duck, Woodcock, and Snipe came chiefly from Holland and England by parcel-post, and sold well, while the Red-legged Partridges were mostly sent from Spain, the Quails and Guinea-fowls from Italy, and the Pigeons, which are also classed as "game" from Italy likewise.

Species.	French.	Foreign.	Total.
Partridges	160,000	421,499	581,499
Hares	18,585	274,941	293,526
Fieldfares and Blackbirds	153,275	110,000	263,275
Quails	14,772	160,000	174,772
Pheasants	8,251	85,000	93,251
Guinea-fowls	1,577	55,000	56,577
Wild Ducks	10,000	40,000	50,000
Plover	619	46,000	46,619
Snipe	7,031	28,110	35,131
Woodcock	11,352	17,115	28,467
Teal	3,934	10,000	13,934
Deer	2,785	10,500	13,285
Wild Boar	299	1,400	1,699
Miscellaneous	316,746	35,000	351,746
	709,226	1,294,555	2,003,781

MAMMALIA.

The Acclimatisation of Red Deer in New Zealand.—A communication under this heading appeared in our last number (p. 24). We have since received the Fourth Annual Report for the year ending 31st August, 1888, of the Wellington (N.Z.) Acclimatisation Society. In this we find it stated that Red Deer are increasing fast on the east coast of South Wairarapa County, and have shown a tendency to spread over new country, namely, the high hills which lie between the Maungaraki Range and the coast; also in the Lower Wairarapa on the ranges lying to the east of the Lake. During the year (1887-88) two hinds and a stag, captured by Mr. Harvey, were purchased at a cost of £20, and liberated on Mr. Holmes's property at the foot of Tararua Range. Unfortunately the stag subsequently died, and another was, with some difficulty, secured at a cost of £6, and left with the hinds. It is hoped that they will prove the nucleus from which the National Deer Park, the backbone range of the island, may be stocked. Few people apparently are aware of the extent of splendid country for Deer that lies above the forest on these ranges. Upwards of 35,000 acres of clear rocky country, covered with grass, form part of a large permanent

reserve of more than 300,000 acres, which it is proposed by the Government to set aside "for climatic purposes." These clear tops are fringed by a belt of thick, almost impenetrable, scrub, from half a mile to a mile broad. Below this line lies birch, gradually changing to mixed forest on the lower levels, full of excellent food for Deer, the home of numerous wild cattle; and in the neighbourhood of Mount Holdsworth and Mitre Peak several tracks cut on to the clear mountain-tops, afford ready access to the Deer.

Wild Dogs in New Zealand.—From the Report above quoted we learn that towards the northern end of the ranges mentioned, Wild Dogs (that is, dogs which have run wild) are very numerous, hunting in packs, on the lower levels, where they find plenty of food in the shape of pigs, Weka-rails, and occasionally even young cattle. It is chiefly from this end of the range that they make raids on the stations on the outskirts of the bush, doing considerable damage by killing sheep. In the interests of stock-owners it is proposed to have poison laid for them on the northern end of the Tararua Range, and on the Ruahine and Pukatoī Ranges, especially in the river-beds near the head waters of the Ruamahunga, Mangahuo, Maungatainoko, and Makakahi, where these animals are said to abound.

Fur-bearing Animals of Siberia.—The Russian Government is, it is stated, about to take steps to preserve the fur-bearing animals of Siberia, which, with the present demand for furs, stand in much danger of extermination. At the great fur fair of Irbit last summer no fewer than 3,180,000 Squirrel-skins were sold; but there were only half-a-million Black Squirrel-pelts offered, against 1,200,000 of the previous year. The other skins sold numbered 1,300,000 Hares, 140,000 Marmots, 30,000 Polecats, 11,000 Blue Fox, 10,000 Badgers, and a smaller quantity of Bear and Wolf.

Pied Squirrel in Norfolk.—Three years ago I reported, in the Naturalist columns of 'The Field,' the occurrence of a pure white Squirrel with pink eyes and claws, the editor, in a footnote, remarking that such a variety was very uncommon. On the 24th October last I received a pied variety of this little animal, procured near Holt. It had a white saddle across its back, all four legs and about half the tail white, also a white tip to the nose.—C. B. DACK (Holt, Norfolk).

Whiskered Bat in Derbyshire.—On New Year's Day I took a male Whiskered Bat, *Vespertilio mystacinus*, in Lathkill Dale, near Bakewell. It was hanging asleep in a damp place, its fur being quite wet, in a tunnel connected with some disused lead-mines. The Bats of this species which I have taken in the copper-workings at Alderley Edge, Cheshire, have frequently been a hundred yards or more from the mouth of the tunnel, but the Lathkill example was within a few feet of the entrance, sleeping

in broad daylight—in fact, I found it before I had lighted my candle.—
CHARLES OLDHAM (Ashton-on-Mersey).

BIRDS.

Notes on London Birds.—The interesting notes on London birds which have lately appeared in 'The Zoologist' have prompted me to offer the following observations on birds which I have met with, chiefly in Kensington Gardens and Hyde Park, during the last few years. As to the Spotted Flycatcher, *Muscicapa grisola*, in Kensington Gardens, which Mr. J. Young says (p. 23) he did not observe last summer, I do not think it was as numerous as in previous summers, but there were certainly some there. I was not in town at the time of their arrival, but my sisters first observed them on May 22nd—very late. In previous years, according to our note-book, they were first observed as follows:—1887, May 4th; 1886, May 15th; 1885, May 9th; and 1884, May 11th. A pair usually build their nest on a ledge of the middle arch of the bridge over the Serpentine; last summer, however, they were not there. The decrease of the London rookeries is much to be regretted, but a good many Rooks may be still seen about the parks. I frequently see a party of about forty feeding on the open ground in Hyde Park near the Marble Arch. It was here, one rather foggy morning in the winter of 1885, that a Sparrowhawk flew close by me; and here, every April, migratory Wheatears may be observed for a day or two. Our smaller migrants, with the exception of the Spotted Flycatcher and Redstart, rarely stay in London during the summer; but the Whitethroat and Blackcap do so occasionally, and I have reason to believe that the Willow Warbler breeds in the Botanical Gardens, Regent's Park. The Garden Warbler may be seen in spring for a short time while passing through town, and sometimes we have short visits from the Chiffchaff and the Lesser Whitethroat—a bird which is very common in the immediate neighbourhood of the Metropolis. On April 19th, 1885, there was quite a large party of Tree Pipits in Kensington Gardens, on the Hyde Park side of the Serpentine, but I have never seen them since. The Meadow Pipit, too, is rarely seen, except in very cold weather, when a few come into London for shelter. Other cold-weather visitors which I have noted are the Sky Lark, the Redwing, Fieldfare, Grey Wagtail, and Missel Thrush. Of these the Lark may be seen occasionally at all seasons, and a few pairs of Missel Thrushes nest in Kensington Gardens. I have seen the Redwing as late as April, but never earlier than December. The Sparrow, Starling, Wood Pigeon, Jackdaw, Blackbird, Thrush, Crow, Hedgesparrow, Robin, and Wren are all residents in greater or less numbers; and the Great Tit, the Coal Tit and the Blue Tit have been noted at almost every season of the year. A Sparrow which my sisters found some years ago in Kensington Gardens, with a broken wing, was

rescued from its inevitable fate, and now lives happily in a cage; its wing has never properly mended, and the bird is consequently unable to fly. After the autumnal moult last year a white tail-feather appeared, and there is one white feather in the head. Varieties of the Sparrow may be seen almost daily. On April 14th, 1886, a sooty black one was observed; on April 16th, 1887, there was a Sparrow in the Zoological Gardens with nearly all the feathers on its back edged with white, giving it a curious streaked appearance. Chaffinches are fairly common in summer, but in winter are much scarcer; I remember one Christmas seeing from my dining-room window a hen Chaffinch searching for food on the deep snow lying in the street. A Bullfinch was seen on May 15th, 1884, near the Serpentine, and a Linnet close to the Bayswater Road, but it is possible that these may have been escaped birds. Greenfinches are scarce in London, but are occasionally observed in the Botanical Gardens, and on Jan. 4th, 1887, I noticed one on a small tree in Oxford Terrace. I have only once or twice come across the Pied Wagtail, and the same remark applies to the Goldcrest, Kingfisher, and Tree Creeper. I nearly caught a Tree Creeper about a year ago in Kensington Gardens by stalking it from the opposite side of a trunk, on which it was busily engaged searching for insects. The Swallow, Martin, Sand Martin, and Swift are all to be seen at times in our parks; but it is a matter of regret that the Martins which we used to watch building their nests every summer under the eaves of a house near the Bayswater Road, have recently deserted the spot. The only other species which have come under my notice in London are the Stonechat, the Cuckoo, the Heron, and the Kittiwake, all of which pay occasional visits to the Metropolis. Curiously enough, I have never had the fortune to see any of the Woodcock or Snipe which have often been reported to have been seen near Hyde Park Corner; but if these are added to this list, which numbers forty-four (exclusive of the doubtful Bullfinch and Linnet), and if we add the other species which are known to have occurred within the last few years (*e. g.*, Whinchat, Black Redstart, Green Woodpecker, Greater and Lesser Spotted Woodpeckers, Nuthatch, Partridge, and Storm Petrel), the result is a really long and interesting list of London birds.—A. H. MACPHERSON (51, Gloucester Place, Hyde Park, W.).

The Invasion of Crossbills in the East of France.—The following is an extract from an article that has appeared in the 'Journal d'Acclimatation' (August, 1888), by M. Brocard, of Besançon, President of the Society of Ornithologists of Franche-Comté:—"Our Society had barely been formed a few months when we had the good fortune to be able to announce one of the most singular facts in Ornithology—an invasion of Crossbills the 'Gipsies of the winged race.' For my own part, though occupied with Ornithology for forty years, I have seen each year in the neighbourhood of Besançon some isolated specimens (of the Crossbill), but never such

numbers as in the present instance. M. Lacordaire, who has amassed a very fine collection of birds (now at Dijon), and was our best naturalist in Franche-Comté, has only recorded the occurrence of this bird as occasional in the lower part of the Department. We know, however, of a young sportsman who at Maiziers, Canton d'Ornans (Doubs), has just killed more than a hundred. Another, at Rougemont, has killed or caught more than forty of them in his garden, and this locality is at the opposite side of the Department. In short, people send them to us from all directions. In less than a week forty-two have passed through our hands. Nothing is easier than to tell the presence of this bird, which is a little smaller than the Hawfinch, and utters a similar cry. It is quite enough to look under the fir-trees, where a quantity of cones may be seen thrown on the ground and torn to pieces, the food of this bird consisting principally of the seeds of the fir. If it only stopped there, it would have done but half its mischief, for it is remarked also to attack the young fir-shoots, and often pulls them off when growing—a decided injury to the tree. This bird, we are told by authorities, comes to us from the North, the region of Conifers. It suddenly makes its appearance in the lower part of the Department,—one cannot tell why,—remains there a longer or shorter time, sometimes breeds there, and, strange to say, it is in January that it constructs its nest at the insertion of a fir-branch, anointing it with the resin of the tree to preserve it from wet. [This we should doubt.—ED.] M. Ricond, of Chaux-de-Fonds, a collector of eggs, says that he has often seen the female Crossbill raise herself from the nest to shake off the snow. . . . It would be important to be able to ascertain the limits of the invasion of these wandering hosts, and we shall therefore be much obliged to those who will be kind enough to communicate their observations to us by post-card, stating the presence of Crossbills in any locality, and later on if they remain there, and, above all, if they breed." In reply to this request for information, M. Brocard adds, "I have received a number of letters telling me of the presence of Crossbills, principally in the East of France. One young sportsman has killed many at St. Etienne (Loire). By the end of August they had almost disappeared. Since then a few have been killed casually, as in every year, but the bulk of the army has departed." May not the late occurrence of Crossbills in Skye be connected with the above, as well as the following;—In December, 1887, five were seen here at Cappagh. In January and February I heard of five separate occurrences in Co. Cork, chiefly near Mallow and Doneraile, and on April 6th I received, in the flesh, one of two Crossbills met with near Cappoquin, Co. Waterford. On November 13th ult., I saw four Crossbills feeding on the cones of larch here.—R. J. USSHER (Cappagh, Co. Waterford).

[Flocks of Crossbills were noticed at Keston, Kent, in October, and a young one having been picked up dead, it was inferred that a pair had

nested in the neighbourhood. See 'The Field,' Nov. 24th, p. 759. On the 18th October a large flock appeared at Edenhall, and some were shot. In Ireland a good many have been lately reported.—ED.]

Sand Grouse in the North-West of England.—I write to ask that if any readers of 'The Zoologist' should happen to hear of any Sand Grouse killed either in Westmoreland or in the heart of the Lake District, they will kindly send me word, or record the bird, or birds. I may say that Mr. C. J. Holdsworth has kindly made enquiries in South Westmoreland, as also has Mr. Duckworth. I have made many local enquiries, but could neither hear of nor see any Sand Grouse either in Westmoreland or among the mountains of Cumberland. Reports from Ullswater, Keswick, Cockermouth, Kendal, Appleby, &c., all negative the idea that any Sand Grouse entered the centre of the Lake District; but I am anxious to thoroughly sift the matter. I may add that, in November last, I visited Walney with Mr. Duckworth, who in May and June had obligingly undertaken repeated visits to Walney at my suggestion. The Sand Grouse all left Walney in July, and only a single bird reappeared in the island early in November. It was on the island at the time of our last visit, but at the south end of it. I may add that the Walney Sand Grouse went on to Bootle and Ravenglass in July, and remained there until they left voluntarily in October, about forty being seen to depart unscathed. I believe that food was then scarce there. In November a small flock reappeared on the Cumbrian Solway, where, but for persecution, one or two hen birds would probably have nested in spring. I regret to say that in November they were ruthlessly shot down, as a matter of sport to lads on the farms. It is possible, however, that one or two pairs may survive, to take advantage of the new Act, but this is uncertain. Since the foregoing lines were written, I regret to say that I have heard that two Sand Grouse were shot on Walney during the present winter. One of these was killed in November, the other on December 20th.—H. A. MACPHERSON.

Sand Grouse in North Yorkshire.—Two Sand Grouse, male and female, were shot on the Kirkleatham estate, near Redcar, on or about the 13th of November last. Both birds were in very good condition as regards plumage, and weighed a little over ten ounces each. The crops contained wheat and buckwheat.—T. H. NELSON (Redcar).

Pallas's Sand Grouse in Hampshire.—A specimen of Pallas's Sand Grouse was sent to me, for preservation, on the 15th December last, from Stubbington, near Fareham, apparently killed the day previous. It was a male bird, in good condition, weighing $8\frac{3}{4}$ oz., in very good plumage, though the wings and tail were rather worn.—W. JEFFERY (Stoke Road, Gosport).

Sand Grouse in Northamptonshire.—On Jan. 15th a male Sand Grouse was shot in the parish of Weedon, as it flew out of some turnips

close to a rick of barley, where it had evidently been feeding, as its crop proved to be full of grain.—W. BAZELEY (Taxidermist, Sheep Street, Northampton).

Weight of the Pectoral Sandpiper.—In 'The Zoologist' for January (p. 33), Mr. Williams, of Dublin, writing on an example of this species obtained during the past autumn in Ireland, says "it almost turned the scale at 8 oz." Surely, for a bird slightly over the dimensions of the Purple Sandpiper, there must be some error in the weight recorded, or perhaps 8 was a misprint for 3. I have never weighed a Pectoral Sandpiper, but, to judge from the size of the bird, and comparing it with the known weight of other waders, I should have thought that $2\frac{1}{2}$ to 3 oz. would have been much nearer the mark. In the last edition of Yarrell's 'British Birds,' the weight of the Don specimen is given at $2\frac{1}{4}$ oz. It is not a bad Snipe which weighs $4\frac{1}{2}$ oz., and a Knot will weigh the same; a fat Dunlin 2 oz. The Great Snipe, in good condition, is twice the weight of a Common Snipe, or 8 to 9 oz. The Golden Plover weighs 8 oz., and I once weighed eight, killed at the same time, which averaged 9 oz., but these were very fine birds and excessively fat. An example of Bartram's Sandpiper (a bird rather larger than a Reeve), loaded with fat, is recorded in Yarrell's 'British Birds' (4th ed. vol. iii. p. 444) as weighing 6 oz. 2 dr.—JOHN CORDEAUX (Great Cotes, Ulceby).

[Considering the weight given by Mr. Williams (*l.c.*) to be very heavy for the size of the bird, and much in excess of that given by R. Gray, 'Birds of West of Scotland,' as quoted in the fourth edition of "Yarrell" (iii. p. 372), we wrote to Mr. Williams to enquire whether any mistake had been made, and he has replied as follows:—"In answer to your enquiries about the weight of the Pectoral Sandpiper, I weighed the bird with a parcel-post balance, and as the indicator just touched the $\frac{1}{2}$ -lb. mark, I concluded that that was the correct weight. I have since tested the balance carefully, and find it is just 1 oz. out, which would make the bird exactly 7 oz.; but from the quantity of fat, which quite soaked the plumage through, I should say it was, at the very least, 2 oz. over the weight of an ordinary individual of the same species. There can be very little doubt the weight given in 'Yarrell' is too little. I showed the bird to Mr. A. G. More, so there can be no doubt of its being a Pectoral Sandpiper. It has since been purchased for the collection in the Science and Art Museum, Dublin."—ED.]

Green Sandpiper in Glamorganshire.—On January 4th, whilst out Snipe-shooting near here, I shot a Green Sandpiper, *Totanus ochropus*. I have been told that this species has been known to frequent the lakes at Penllergare, near Swansea; and I have also known of one that was obtained at Sant-y-nill Pond, St. Fagans, and another on Ely River, shot by the gamekeeper at St. Fagans, in 1885. Strictly speaking, however, the

species must be considered a scarce one in this county.—DIGBY S. W. NICHOLL (Cowbridge, Glamorganshire).

Food of the Manx Shearwater.—In reply to Mr. C. R. Gawen's enquiry (p. 24), whether the sprats disgorged by the Manx Shearwater might have been thrown overboard by some of the fishermen, as well as the entrails (also disgorged), I do not think so, for the sprats looked perfectly fresh and silvery, as if only swallowed a few minutes before the bird was shot: another reason against the supposition is, that fishermen are too economical of their bait to throw any of it overboard while fresh; and the third reason is, that during that week's fishing, and on that day, we used herrings for bait, there being no sprats for sale in the bait market at Queenstown. But why there should be any doubt as to the Shearwater catching fish for food, because it has not been recorded that any person has actually seen them catch and swallow fish, I cannot understand. [Capt. S. G. Reid has so observed them. See 'The Ibis,' 1888, p. 80.—ED.] Their gliding flight, and skimming the surface of the water, would give very little opportunity to the observer to obtain even a passing glance at the sort of food they pick up: even the very shape of the Shearwater's bill, with its sharp sides and hooked point, shows that it must be a very efficient weapon for both catching and holding such slippery prey. On referring to my notebook I find that we were out on the "Maide," a fishing-ground about three miles outside Cork Harbour, fishing for Hake, and while at anchor—as early as 12 o'clock in the day—we observed several flocks of Shearwaters flying about, and as one flock passed close by I knocked down two birds, and, as we got into the small boat to pick them up, one of them—very badly hit, almost dying—threw up some solid matter when caught; the second, being only winged, swam off, diving several times, but only for a short distance, under water, and, when overtaken and about to be caught, disgorged the sprats and fish entrails, as I have already stated. On the same occasion I remarked a pair of dark-coloured Shearwaters, much larger than the others, amongst a flock of the common ones; these I took to be the Great Shearwater, *Puffinus major*; but a short time ago having been shown a specimen of the Sooty Shearwater, *P. griseus*, taken off the Kerry coast, I am now of the opinion they were the last-named species, from the under parts being so much darker than those of the Great Shearwater. The occurrences of that day were deeply impressed on my memory, for it was the last day's Hake-fishing I ever enjoyed. We took our eighty-five Hake; and my brother—quite a small boy—caught sixteen fine fish, and a Turbot of six pounds weight, on his own line.—ROBERT WARREN (Moyview, Ballina).

Habits of the Manx Shearwater.—Mr. Gawen and myself have arrived at such a pleasant termination to our discussion on the Shearwater,

that for the present I intend to say nothing more on that score. But I should like to allude to another point. Probably most of your readers are accustomed to find the Shearwater nesting at a very moderate height above sea-level; I thought myself that the colony which nests on Eigg, at a height of nearly 1000 feet, was unusually ambitious. Mr. M. Byles, however, who has tenanted the island of Rum as a deer forest for several seasons, informs me that Shearwaters breed on that island at a height of more than 2000 feet above the sea—a pretty contrast to their quarters at Annet.—H. A. MACPHERSON.

Bittern in Lancashire.—A fine male Bittern was shot on Dec. 26th, 1888, on Bryn Moss, about three miles from Wigan, and was sent for preservation to a taxidermist in the town, at whose place I had an opportunity of seeing it. It had been killed by a single pellet, which had passed through the neck near the base of the skull and severed some of the principal blood-vessels, death ensuing from hæmorrhage into the throat. It was able to run vigorously a short distance after it was shot, and being pursued by a dog the bird stood at bay, and, erecting its crest, assumed such a threatening and terrifying aspect that the dog turned tail and refused to face it. The body was loaded with fat; the stomach was quite empty, its last meal having been thoroughly digested and disposed of. The last occurrence of the Bittern in this district, as far as I know, was about twenty-eight years ago, when two were shot at the same time on a small mill-pond at Roby Mill, Upholland, about five miles from here.—W. WORTHINGTON (Wigan).

Rooks in the Isle of Wight: Correction of Error.—I find a mistake has been made in the note I sent you (p. 28). It was a "brown" Rook that was thought strange, though white varieties are not uncommon here, as elsewhere. The Rook is as numerous a species in the Isle of Wight as in most parts of England. The error occurred in the copying, which I regret.—HENRY HADFIELD (High Cliff, Ventnor).

Nutcracker, Crossbill, and Sand Grouse in Norfolk.—On Nov. 9th I received for preservation a female specimen of the Nutcracker, *Nucifraga caryocatactes*. It flew out of an old chalk-pit, and was shot by a game-keeper in mistake for a young Blackbird. On Nov. 24th, when out for a walk, I saw five Crossbills feeding on fir-cones, the first I have seen in this district for twenty years. I think they are rather rare as a Norfolk bird. I had a right and left shot at a male and female, but unfortunately lost the female; the male I obtained was a fine red bird. On Nov. 30th I bought an old male Sand Grouse with a very long tail and fine orange head. I record this as we had plenty in the summer, but they all disappeared about September. The crop contained a good number of wheat-grains, mixed with the customary seeds that were found in all the earlier.

killed birds. I think the visitation is about over, as I hear now of only here and there a straggler or two left behind, and it may be many a long year before they pay us another visit.—C. B. DACK (Holt, Norfolk).

Scarcity of the Carrion Crow in Norfolk.—Referring to the Editor's suggestion in the footnote (p. 10), it is possible that some of the Black Crows seen by me in the marsh were young Rooks, but some were certainly Carrion Crows. I am quite aware of the scarcity—even rarity—of the latter bird in the northern portion of Norfolk, and these were the first I had met with in that district, although I saw some flying low over Hickling Broad in December, 1886.—OLIVER V. APLIN.

Lapland Bunting in Ireland.—In the migration schedule of Mr. George Dunleavy, Principal Lightkeeper on the Fastnet Rock, Co. Cork, seven miles from shore, the following entry occurs under date Oct. 16th, 1887:—"One Skylark and one Twite (supposed) dead on rock, at 9 a.m.—believed to be killed striking; wind light, east, clear." On the night of 15th several Skylarks and Starlings are entered as striking, 8 to 11 p.m.; wind E.N.E., hazy. The "Twite (supposed)" was forwarded to me in the flesh, and it proved to be a female Lapland Bunting, *Plectrophanes lapponicus*. This is the first instance of the occurrence of this species in Ireland. Prof. Newton writes that the Greenland examples of *P. lapponicus* are generally larger than those from Europe, and he thinks my specimen is of European origin, but does not speak positively. Dr. Gadow is inclined to hold the opposite opinion, but he also expresses himself cautiously. The above occurrence is mentioned briefly in Saunders's 'Illustrated Manual of British Birds,' but none of the above details have yet been published.—R. M. BARRINGTON (Fassaroe, Bray, Co. Wicklow).

Crossbills in Ireland.—I have received several Crossbills lately from Letterkenny (Co. Donegal), Doneraile (Co. Cork), Parsonstown, King's County, Basonbay (Co. Cavan), Tipperary, and Edenderry, which shows they are very common in Ireland this winter. They belong, without exception, to the common species.—E. WILLIAMS (2, Dame Street, Dublin).

Swallows in December.—On the morning of December 17th, six Martins, *Hirundo urbica*, were observed feeding about the cliffs near Marazion, Cornwall, and I enclose a specimen which was shot for identification. On the previous evening I watched for some time three of them, apparently male birds in full plumage, which appeared quite as strong and active as they are in the summer time. Since September last this species has appeared at uncertain intervals, from one to three weeks apart, and in sunshine just as frequently as in dull and cold weather. For some weeks past, on bright and mild days, the Starlings have been flying about picking up insects in the air, very much after the fashion of Swallows.—F. W. MILLETT (Marazion, Cornwall).

Rough-legged Buzzard in Lancashire.—The local papers of Nov. 18th having reported the capture of an Eagle in the neighbourhood of Bolton, and having reason to doubt the statement, my brother and I arranged to go over and see it. Instead of a Golden Eagle we found that the bird was *Buteo lagopus*, with the plumage rather soiled and one leg nearly off, but in other respects in good condition. 'The Field' for Nov. 10th reported the occurrence of two more near Leeds.—C. E. STOTT (Lostock, Bolton).

Little Gull in Glamorganshire.—Since forwarding my account of the Little Gull in Glamorganshire (p. 25) I have been informed by Mr. Cording, taxidermist, of Cardiff, that a male specimen of this species was shot, at the mouth of the Taff, in March, 1885.—DIGBY S. W. NICHOLL (Cowbridge, Glamorganshire).

Wood Warbler at Cley.—Perhaps the large Warbler met with in the scrub at Cley, by Mr. Aplin (p. 10) was a Wood Warbler, *Phylloscopus sibilatrix*, which is a species I have shot there in the young plumage in autumn.—J. H. GURNEY, jun. (Keswick Hall, Norwich).

FISHES.

Burbot off the Yorkshire Coast.—On December 26th, 1888, Mr. T. H. Nelson sent me a fish which he stated to be very rare at Redcar, and not known to the fishermen. I saw at once it was a Burbot, *Lota vulgaris*, and in this determination I was confirmed by Mr. Edward E. Prince, B.A., who has paid much attention to the British food-fishes, and to whom I showed it the same day. Mr. Nelson has since informed me that it was caught on the day he sent it off, at sea, about a mile off the Point of Huntcliffe. The fishermen at Redcar told him they had never seen a fish like it before. It was caught on a mussel-bait. Being the first time I have heard of this—a river-fish—being caught at sea, I should be glad to learn if similar instances are known.—W. DENISON-ROEBUCK (Sunny Bank, Leeds).

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

January 17, 1889.—Mr. W. CARRUTHERS, F.R.S., President, in the chair.

The following were elected Fellows:—J. R. Green, M.A., Prof. Botany Pharmaceutical Society; R. J. Harvey Gibson, M.A., Lecturer Botany Univ. Coll. Liverpool; James W. White, of Clifton, Bristol; and Herbert Stone, of Handsworth, Birmingham. The following recently elected

Fellows were formally admitted:—Alfred B. Rendle and Henry Powys Greenwood.

On behalf of M. Buysman, of Middleburg, Mr. B. D. Jackson exhibited a series of careful dissections of *Nymphæa carulea*, collected by Dr. Schweinfurth in Egypt.

Mr. D. Morris exhibited specimens of drift-fruit from Jamaica, where he had collected no fewer than thirty-five different kinds brought by the gulf-stream from the mouths of the Orinoco and Amazon. Although the species exhibited had not been determined with certainty, it was believed to be probably *Humiria balsamifera*, Aud. (the flower of which is figured by Eichler, 'Flora Brasiliensis,' vol. xii. pt. 2, p. 420, pl. xcii.), but the fruit undescribed. It was commonly known in French Guiana as *Bois rouge*, and from it was obtained a gum used medicinally and burnt as incense. An interesting discussion followed, in which Mr. J. G. Baker, Mr. Rolfe, and Mr. Breese took part.

Mr. T. Christy exhibited a material felted from Manilla hemp, and waterproofed, very strong and light, and particularly useful for surgical bandages, for which purpose it was highly recommended by army surgeons.

Mr. F. Crisp exhibited some specimens of agate, so curiously marked as to lead to the erroneous supposition that they enclosed fossil insects and crustacea.

A paper was then read by Mr. J. G. Tepper, on the natural history of the Kangaroo Island Grass Tree, *Xanthorrhæa Tateana*. This tree grows abundantly in Kangaroo Island, South Australia, in poor gravelly and sandy soil, intermixed with ferruginous concretions, and attains a height of from 6 to 14 feet, with a diameter of 6 to 18 inches, and a floral spike of from 10 to 19 feet. It is thus a most conspicuous plant, and lends a peculiarly weird aspect to the country it occupies. Its rate of growth is described as very slow, old settlers having remarked but little change in individual trees after thirty years' observation. The most remarkable feature in the structure of the stem is the formation of a dense ligneous central core immediately above and connected with the roots, exhibiting numerous annular zones traversed by transverse (medullary) fibres. The flowers are borne in a dense spike upon a smooth peduncle. Individually they are inconspicuous, of a whitish colour, and develop a strong odour and abundant nectar during the warmer part of the day, when they are visited and fertilized by hymenopterous insects, the most remarkable being a large metallic-green Carpenter Bee (*Xylocopa*), which tunnels out cells in the dead flower-stalks. An interesting discussion followed upon the botanical position of the Grass-trees, and the antiquity of the type, in which the President, Mr. A. W. Bennett, Mr. J. G. Baker, Mr. Morris, and Mr. Rolfe took part.

The meeting adjourned to February 7th.

ZOOLOGICAL SOCIETY OF LONDON.

December 18, 1888.—HOWARD SAUNDERS, F.Z.S., in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of November, and called attention to a specimen of the Small-clawed Otter, *Lutra leptonyx*, presented by Mr. W. L. Sclater, Deputy Superintendent, Indian Museum, Calcutta, new to the Society's Collection; and to a Monkey of the genus *Cercopithecus*, from South Africa, apparently referable to the Samango Monkey, *C. samango*, also new to the Society's Collection.

Mr. G. B. Sowerby read descriptions of fourteen new species of Shells from China, Japan, and the Andaman Islands, chiefly collected by Deputy Surgeon-General R. Hungerford.

A communication was read from Mr. Herbert Druce, in which he gave an account of the Lepidoptera-Heterocera collected by Mr. C. M. Woodford in Guadalcanar Island, Solomon Islands. The collection was stated to contain examples of fifty-three species, eighteen of which were described as new to science.

Mr. J. H. Leech read the second portion of a paper on the Lepidoptera of Japan and Corea, comprising an account of the *Sphingidæ*, *Bombycidæ*, *Notodontidæ*, and *Cymatophoridæ*, in all 352 species. Of these thirty-eight species were now described as new to science.

Dr. Hans Gadow read a paper on the numbers and on the phylogenetic development of the remiges of Birds. The author showed that the number of primaries is of very limited taxonomic value, as was proved by the numerous exceptions mentioned in the lists contained in the paper. A comparison of the remiges of the Penguins with those of other *Carinata* seemed to indicate an extremely low stage in the Penguins, which, however, was not borne out by other anatomical features. The *Ratitæ* were most probably descendants of birds which formerly possessed the power of flight and had lost it. This view was strengthened by an examination of the structure of their wings and of the feathers of their nestlings. The paper concluded with general remarks upon the probable gradual development of the organism of flight in birds.

January 15, 1889.—Prof. FLOWER, C.B., LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of December, 1888, and called attention to a young Chimpanzee purchased of Mr. Cross, of Liverpool, December 6th, which was undoubtedly of the same species as the specimen purchased October 24th, 1883, still living in the Society's Gardens, and was, so far as could be at present ascertained, referable to the Bald-headed Chimpanzee, *Anthropopithecus calvus*.

A letter was read from Heer F. E. Blaauw, of Amsterdam, containing an account of the development of the horns of the White-tailed Gnu, as observed in specimens bred in his Menagerie.

Prof. Newton exhibited a specimen of *Pennula millsii*, Dole, brought from the Sandwich Islands by Mr. S. B. Wilson, remarking that it seemed to be specifically identical with *Rallus obscurus*, Gmelin, a species which has not been lately recognised.

Prof. Bell made some remarks on the question of the food of *Bipalium*.

Canon Tristram made some remarks on a specimen of *Emberiza cioides*, a Bunting of Siberia, of which a specimen was believed to have been obtained in this country at Flamborough in October, 1887.

Prof. F. Jeffrey Bell read a note on the Echinoderm fauna of the Bay of Bengal.

Mr. F. E. Beddard and Mr. Frederick Treves gave an account of the anatomy of the Sumatran Rhinoceros, as observed in two specimens of this animal that had lately died in the Society's Gardens. The muscular anatomy of the limbs of this Rhinoceros was especially treated of.

Prof. Newton read a paper on the breeding of the Seriema, *Cariama cristata*, in the Society's Gardens.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

The Fifty-sixth Anniversary Meeting, Jan. 16, 1889.—Dr. D. SHARP, F.L.S., President, in the chair.

An Abstract of the Treasurer's Accounts, showing a balance in the Society's favour, was read by Mr. Osbert Salvin, F.R.S., one of the Auditors; and Mr. H. Goss read the Report of the Council. It was announced that the following gentlemen had been elected as Officers and Council for 1889:—*President*, the Right Hon. Lord Walsingham, M.A., F.R.S.; *Treasurer*, Mr. Edward Saunders, F.L.S.; *Secretaries*, Mr. Herbert Goss, F.L.S., and the Rev. Canon Fowler, M.A., F.L.S.; *Librarian*, Mr. Ferdinand Grut, F.L.S.; and as other Members of Council, Mr. Henry W. Bates, F.R.S.; Mr. H. J. Elwes, F.L.S.; Mr. William H. B. Fletcher, M.A.; Mr. F. DuCane Godman, M.A., F.R.S.; Prof. Raphael Meldola, F.R.S.; Dr. Philip Brooke Mason, F.L.S.; Mr. Osbert Salvin, M.A., F.R.S.; and Dr. David Sharp, F.L.S.

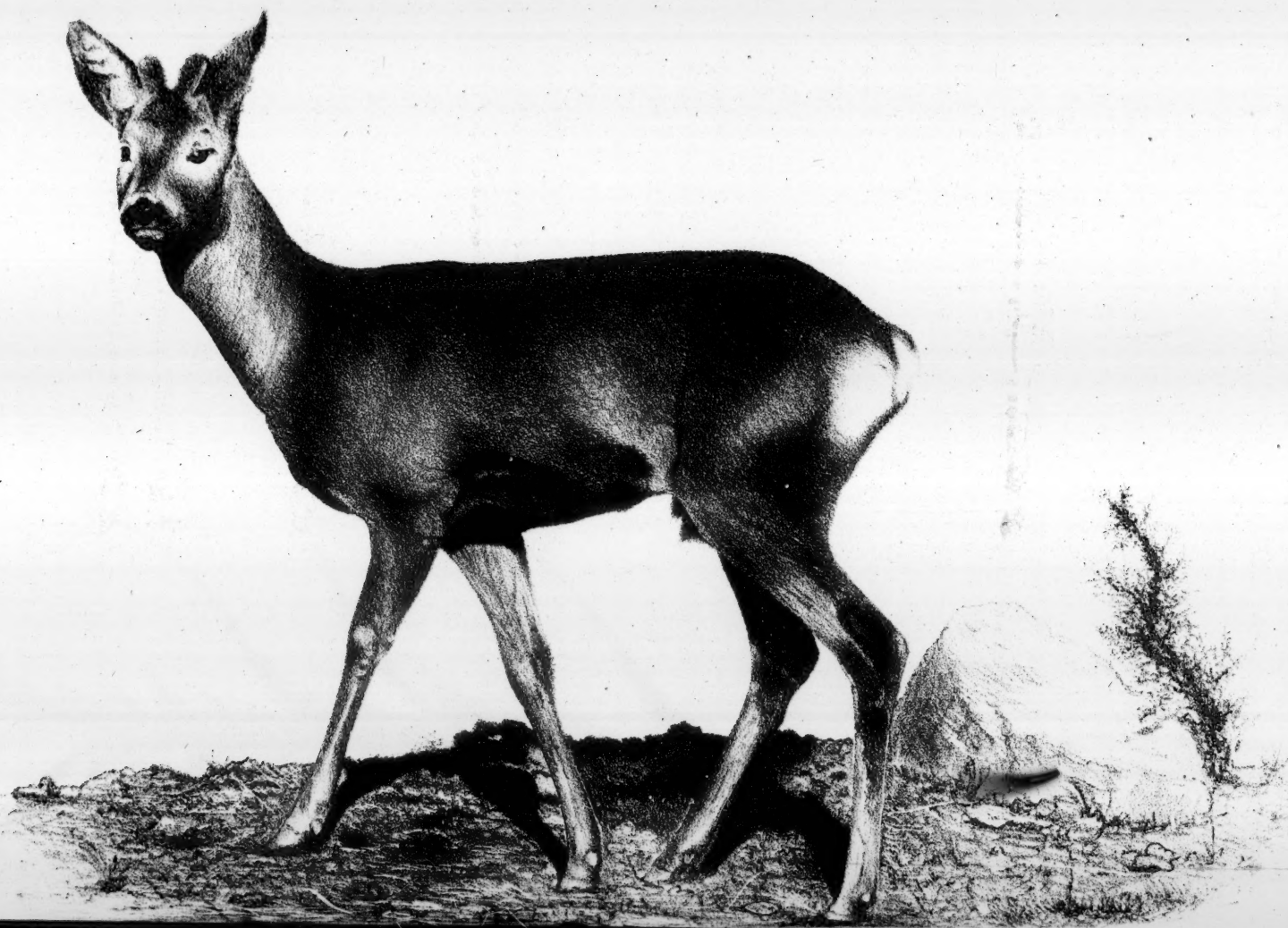
Dr. Sharp, the outgoing President, then delivered an Address, for which a vote of thanks to him was moved by Mr. Elwes, seconded by Mr. Osbert Salvin, and carried. A vote of thanks to the Treasurer, Secretaries, and Librarian was moved by Mr. J. W. Dunning, seconded by Lord Walsingham, and carried. Mr. Saunders, Mr. Goss, and Mr. Grut severally replied.—H. Goss, *Hon. Secretary*.





Zool. 1889.

Plate I.



L. HARRISON DEL.

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